ledons, we feel the generic and even the ordinal determinations of the fossils to be throughout very doubtful, and to be reducible in most cases to the category of bold guesses. To refer the majority of living and growing monocotyledons, and especially of such orders as *Gramineæ*, *Cyperaceæ*, *Naiadeæ*, *Palmæ*, and *Liliaceæ*, to their genera from their leaves alone, is impossible ; much more then from the fragmentary fossil remains of these organs. Such genera and species, however, have been made, and Dr. Schimper must sweep them into his net ; and the more ungrateful the task, the more obliged we should be to him or performing it so well and so fully.

We shall look for the Dicotyledonous volume of this great and most useful work with much interest, and lay an account of it before our readers as soon as it appears

J. D. HOOKER

THE YOSEMITE VALLEY AND THE SIERRA NEVADA OF CALIFORNIA

The Yosemite Guide-book. By J. D. Whitney. Published by authority of the Legislature of California. 1869.

MR. J. D. WHITNEY, State Geologist of California, has prepared a guide-book to the Yosemite Valley and the adjacent country, which is a model of its kind. It is well written, and is eminently lucid in its descriptions ; it is amply illustrated, and has two clear maps on a large scale half a mile and two miles to the inch) ; and it is admirably printed (at the University Press, Cambridge, U.S.). The unpretending title of the work gives but a poor idea of its contents ; botanists, geologists, and geographers will find pleasure in reading it, although it is ostensibly put forth or the sake of the ordinary tourist. It is a valuable contribution to our knowledge of the Pacific coasts of America, and throws light upon a large district which remains very imperfectly known.

The British public has been already tolerably familiarised with the most striking characteristics of the Yosemite* Valley, Mariposa County, California, by the fine picture of Mr. Bierstadt ; and some excellent photographs (by Watkins, of San Francisco), which are now lying before us, show that that artist has not drawn upon his imagination. Some of our readers, however, may perhaps need to be told that it is not only a very remarkable valley, but boasts the possession of the highest waterfalls (with an equal volume of water) in the world. It is trough-shaped ; a cross section of it is like the letter U, and in this respect, as well as in its length, breadth, and the steepness of its cliffs, it is comparable to the Valley of Lauterbrunnen in Switzerland, but the dimensions of its cliffs exceed those of that valley, as much as its chief waterfall (the great Yosemite Fall) surpasses the Staubbach. This magnificent cascade makes a descent of more than half a mile in sheer height, and 500,000 cubic feet of water pass over it per hour during the month of June. It is made up of two falls—an upper one, which has a vertical descent of 1,500 feet, and a lower one of 400 feet. The remainder of the total height is consumed by a series of cascades between the two ; but seen from the opposite side of the valley, the effect is increased rather than diminished by the subdivision, and it well deserves all the praise which has been lavished upon it.

Mr. Whitney does not believe that the peculiar trough form of the valley has been even modified by glacier action. There are no proofs, he says, "that glaciers have ever occupied the valley, or any part of it," and he scouts the notion that it was *produced* by glacial agency. "In short," he says, "we are led irresistibly to the adoption of a theory of the origin of the Yosemite in a way which has hardly yet been recognised as one of those in which valleys may be formed, probably for the reason that there are so few cases in which such an event can be absolutely proved to have occurred. We conceive that during the process of upheaval of the Sierra, or possibly at some time after that had taken place, there was at the Yosemite a subsidence of a limited area, marked by lines of 'fault' or fissures crossing each other somewhat nearly at right angles. In other and more simple language, the bottom of the valley sank down to an unknown depth, owing to its support being withdrawn from underneath, during some of those convulsive movements which must have attended the upheaval of so extensive and elevated a chain, no matter how slow we may imagine the process to have been." It should be mentioned that the Yosemite Valley is exclusively granite, no remains of sedimentary rocks having been found within it.

Although the Yosemite Valley itself is not ice-ground, in its neighbourhood there are very emphatic traces of glacial action, and it is said that in some places the polish is so perfect upon the rocks, that "the surface is often seen from a distance to glitter with the light reflected from it, as from a mirror." It is remarkable that no glaciers are known to exist at the present time throughout the entire length of the Sierra Nevada in California. Throughout the entire region, from 35° to 42° N. lat., Mr. Whitney asserts that there is not a single glacier. Yet Mount Shasta, at the northern extreme, with a height of pretty well 15,000 feet, is more or less permanently covered with snow upon its upper 6,000 feet, and at the southern end of the district there are numerous peaks (now being surveyed) which range from 14,000 to 15,000 feet, and even higher. We confess that we do not understand how "masses of snow, several miles long, and hundreds of feet in thickness, remain all summer without showing any indication of becoming glacier ice," if they remain permanently of these dimensions ; but as such seems to be the fact, there is no use in disputing it.

The most valuable portions of Mr. Whitney's book are those which he has devoted to elucidating the topography of the mountain ranges bordering upon, or in proximity to, the Pacific Coast. We learn from him in a clearer way than we have seen it put before, that there are two great ranges of mountains running throughout the length of California, which are orographically distinct. These he terms the Coast Ranges, and the Sierra Nevada. They are roughly parallel to each other, and to the coast line ; and they are divided by the valleys of the Sacramento and San Joaquin rivers. The coast ranges are, geologically speaking, younger than the Sierra Nevada, and they are chiefly made up of cretaceous and tertiary strata. They are also of comparatively small elevation, and their highest summits attain only 8,000 feet. The core of the Sierra Nevada, on the other hand, is mainly granitic, flanked on both sides by metamorphic slates, and has a much greater elevation.

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* The word Yosemite means a full-grown grisly bear.

Both of these ranges are totally distinct from the Rocky Mountains, which are hundreds of miles further inland. The only drawback to travel among them is the "poor Indian," who watches travellers from a distance, and signals by smokes. We can well understand the enthusiasm of Mr. Whitney for the mountains of California, and we heartily hope with him, that neither the Yosemite valley nor the grove of Sequoias which—by a unique act of Congress—were ceded to the State for public use, resort, and recreation, for all time, will be suffered to fall into the hands of the acute but unpatriotic speculators who are endeavouring to use them for their own purposes; and who will, if they are not "sat upon," undoubtedly turn them into "gigantic institutions for fleecing the public." W.

OUR BOOK SHELF

The Science and Art of Arithmetic: Part II. Vulgar Fractions; Part III. Approximate Calculations. By A. Sonnenschein and H. A. Nesbitt, M.A. 260 pp. (London: Whittaker & Co. 1870.)

THE authors of this excellent school arithmetic are to be congratulated on having brought their work to a successful termination. In our notice of Part I., which appeared in a former number of NATURE,[*] we pointed out the principles by which the authors had been guided, and as we believed those principles to be sound, and the authors to have carried them out successfully, we had no hesitation in commending the work as we did. The same good arrangement, ample store of illustration, and copious examples for practice, are to be found in this volume as had place in the first. The fulness with which the elementary portions were treated appeared to us to be a merit rather than a defect. From such wealth of illustration each teacher could select what was most suited to his purpose. In this volume we have more advanced subjects treated in like manner. But an analysis of the contents will give a good idea of the work. Under Part II. we have the subject of Vulgar Fractions clearly treated, with applications to Practice, and a chapter which treats of Proportion, the Chain Rule, Compound Proportion, and Proportional Parts. In Part III. are chapters on Converging Fractions, Decimals with their properties, and several applications to Money, Weights, Measures, &c., the Metric System, Progressions, Interest, Discount, Stocks, Evolution, and a good chapter on Arithmetical Complements. There is also a chapter in which we have Continued Product to a given limit, Compound Interest, Equation of Payments, Complex Decimals, Duodecimals, and International Calculations. At the end of the work are given 250 Miscellaneous Exercises. There is enough here to satisfy any youthful arithmetician, and the methods employed are the "latest out." The complete work gives ample evidence that it is the composition of men who have given much time and thought to the subject, and have had much tuitional experience. R. T.

Die Schmetterlinge Deutschlands und der Schweiz, systematisch bearbeitet. Von H. von Heinemann. Zweite Abtheilung, Kleinschmetterlinge. Band II. Die Motten und Federmotten, Heft 1. 8vo. (Brunswick: C. A. Schwetschke and Son, 1870.)

M. HEINEMANN'S work on the Lepidoptera of Germany and Switzerland is well known to entomologists, by whom it is highly valued. It contains an admirable systematic description of the species of butterflies and moths inhabiting the above-mentioned countries, and has been carried out by the author in so conscientious a manner that the students of European Lepidoptera can hardly wish for a better handbook. The author is now approaching the conclusion of his labours. The first section, including the larger forms of Lepidoptera, was completed some years ago; of the second section, the first volume, published in 1863 and 1864, contained the descriptions of the Tortrices and Pyralides, and the part now before us commences the true Microlepidoptera, the Tineæ and Pterophori. The former are exceedingly numerous, and the present portion contains descriptions of the species of only five out of the thirteen families into which the author divides the group. W. S. D.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.*]

The Teachings of Tribulation—"The Captain"

THE technical questions suggested by the loss of Her Majesty's ship *Captain* have received their full share of attention—indeed, more than their share, for able leaders and letters in the newspapers will not teach us how to build war ships. I do not intend to trouble you with freeboards, turrets, and metacentres. Nor do I propose to dive into all the published evidence and statements, in order to discover some delinquent on whom to saddle the blame of the terrible disaster.

The case of the *Captain* is an example, on a scale sufficiently startling to attract the notice of the whole nation, of a want in our administrative arrangements which has hitherto escaped the notice of the many. The few who have long deplored this want did not require that a quarter of a million of money and 500 gallant lives should be sacrificed in order to prove its existence. Employing, then, the loss of the *Captain* as merely one very striking instance out of thousands of others that pass unheeded every day, permit me to suggest what is the administrative lesson taught by it. The facts must first be briefly stated. This cannot be better done than by quoting a portion of the judgment of the court-martial, who tell us that they "find it their duty to record the conviction they entertain that the *Captain* was built in deference to public opinion as expressed in Parliament and through other channels, in opposition to the views and opinions of the Controller of the Navy and his department, and that the evidence all tends [*sic* in *Times*' report] that the Controller of the Navy and his department generally disapproved her construction."

Now let us analyse the system the working of which justified the above reiterated condemnation. Beginning at the top, we have a Minister of State, a gentleman usually of high character and great general attainments, but not necessarily conversant with naval architecture. Being a party politician, he may at any moment vacate his post on some question totally unconnected with his department. In order to provide him with the knowledge which he does not pretend to possess, and to supply the element of permanence in which he is also deficient, he has under him secretaries, superintendents of works, and scientific advisers. These persons are in the strictest sense of the terms also subordinates of the Minister, bound to obey his orders. Outside this department are two bodies, independent of the Minister, and capable of bringing enormous pressure to bear upon him, namely, inventors and the public—the first interested, the second ignorant of science and owing no responsibility to any one. I disclaim any personal allusions in this analysis. Well, here we have two forces pulling the Minister different ways. The whole question is, whether the departmental, or, as we may call it, the home, force is strong enough to enable the Minister to resist, when necessary, the foreign invader; whether reiterated adjurations, noisy clamour, and threatened loss of popularity will silence and overbear official counsels. The question is already answered. The official counsels were overborne. It may be argued, however, that the official counsels may be wrong and the public right. But the official counsels in the case before us were right and the public wrong. Here we are landed in a difficulty. How is the Minister, who by our hypothesis has no knowledge of the question at issue, to tell when his advisers are right and when the public? He cannot tell. But he exercises his discretion. Now, it must be remembered that his advisers are his subordinates, and therefore, taking men as we find them on an average, not in a

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[*] See NATURE, Vol. II., p. 186.

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